

What is claimed is:

1. A method of correcting an audio level of a stored program asset,  
comprising:  
retrieving a stored program asset, the asset having audio encoded at a first  
loudness setting;  
identifying dialog of the audio of the asset;  
determining a loudness of the dialog;  
comparing the determined loudness to the first loudness setting; and  
re-encoding the asset at a second loudness setting corresponding to the  
second loudness, if the first loudness setting and the determined loudness are different by more  
than a predetermined amount.
2. The method of claim 1, wherein the audio is encoded at a DIALNORM  
setting, the method comprising:  
determining a loudness of the dialog, wherein the determined loudness is a  
DIALNORM of the dialog.
3. The method of claim 1, comprising identifying the dialog by:  
dividing the audio into time intervals;  
determining a loudness of each time interval; and  
identifying time intervals with intermediate loudnesses.
4. The method of claim 3, comprising:  
determining the loudness of each time interval based on psycho-acoustic  
criteria.

5. The method of claim 4, comprising:  
determining the loudness of each time interval based on  $L_{eq}(A)$ .
6. The method of claim 3, further comprising:  
discarding time intervals with high and low loudnesses.
7. The method of claim 3, comprising:  
identifying time intervals with intermediate loudnesses by creating a histogram of the loudnesses of the intervals.
8. The method of claim 3, further comprising:  
determining a loudness of the time intervals having an intermediate loudness.
9. The method of claim 8, comprising determining the loudness of the time intervals having intermediate loudnesses by:  
computing a function of the loudnesses of the time intervals having intermediate loudness.
10. The method of claim 9, wherein:  
the function is an average, a mean or a median of the loudnesses of the time intervals having intermediate loudness.
11. The method of claim 8, wherein determining the loudness of the time intervals having intermediate loudnesses comprises:  
determining a DIALNORM of the time intervals having intermediate loudnesses.

12. The method of claim 1, further comprising:  
correcting compression of the audio of the program.
13. The method of claim 1, further comprising, prior to retrieving the stored  
program asset:  
receiving a program from a source; and  
storing the program in memory as an asset for later transmission.
14. The method of claim 1, further comprising:  
demultiplexing the audio from the program asset, prior to identifying the  
dialog.
15. The method of claim 1, further comprising:  
decompressing the audio, prior to identifying the dialog.
16. The method of claim 15, further comprising:  
decompressing the audio by converting the audio to a pulse coded  
modulation format.
17. The method of claim 1, further comprising:  
performing automatic gain control on the audio, prior to identifying the  
dialog.
18. The method of claim 1, further comprising:  
filtering the audio, prior to identifying the dialog.

19. The method of claim 1, comprising identifying the dialog by:  
filtering the audio.
20. The method of claim 19, comprising:  
filtering the audio outside of a range of from about 100 Hertz to about  
1,000 Hertz.
21. The method of claim 1, further comprising:  
retrieving a second stored program asset, the second asset comprising  
audio encoded at a third loudness;  
identifying dialog of the asset;  
determining a fourth stored loudness of the dialog;  
comparing the fourth loudness to the third loudness; and  
re-encoding the asset at the fourth loudness, if the third loudness and the  
fourth loudness are different by more than a predetermined amount.
22. The method of claim 1, comprising retrieving an asset comprising a  
program, a chapter of a program, or an advertisement.
23. The method of claim 1, further comprising:  
storing the asset with the re-encoded loudness setting.
24. The method of claim 1, wherein the audio is encoded at a normalized  
loudness setting, the method further comprising:  
normalizing the determined loudness of the dialog;

comparing the normalized determined loudness to the normalized loudness setting; and

re-encoding the asset at a second loudness setting corresponding to the normalized determined loudness if the first loudness setting and the normalized determined loudness are different by more than a predetermined amount.

25. A method of correcting an audio level of a stored program asset, comprising:
  - retrieving a stored program asset, the asset comprising audio having an encoded DIALNORM setting;
  - demultiplexing the audio from the retrieved asset;
  - decompressing the audio;
  - identifying dialog of the audio;
  - determining a DIALNORM of the dialog;
  - comparing the determined DIALNORM to the encoded DIALNORM setting;
  - re-encoding the asset at the determined DIALNORM if the encoded DIALNORM and the determined DIALNORM are different by more than a predetermined amount; and
  - storing the asset with the re-encoded DIALNORM.

26. The method of claim 25, comprising identifying dialog by:
  - dividing the audio into time intervals;
  - determining a loudness of each time interval; and
  - identifying time intervals with intermediate loudnesses.

27. The method of claim 26, comprising:  
identifying time intervals with high, intermediate and low loudnesses by  
creating a histogram.
28. The method of claim 25, comprising:  
decompressing the audio by converting the audio into a pulse code  
modulation file.
29. The method of claim 28, further comprising:  
performing automatic gain control on the pulse code modulation file prior  
to identifying the dialog.
30. The method of claim 25, further comprising:  
filtering the audio.
31. The method of claim 25, further comprising:  
correcting compression of the audio.
32. A method of processing an audio level of a stored program asset,  
comprising:  
retrieving a stored program asset, the asset having audio encoded at a  
loudness setting;  
identifying dialog of the asset;  
determining a loudness of the dialog; and  
comparing the determined loudness to the loudness setting.

33. A system for correcting an audio level of a stored program asset, the system comprising:

- means for retrieving a stored program asset, the asset having audio encoded at a first loudness setting;
- means for identifying dialog of the asset;
- means for determining a loudness of the dialog; and
- means for re-encoding the asset at a second loudness setting corresponding to the determined loudness, if the first loudness setting and the determined loudness are different by more than a predetermined amount.

34. The system of claim 33, further comprising:

- means for storing the asset.

35. A system for correcting an audio level of a stored program asset, the system comprising:

- memory to store the program asset, the asset having audio encoded at a first loudness setting; and
- a processor coupled to the memory, the processor being programmed to:
  - retrieve a stored program asset,
  - identify dialog of the asset;
  - determine a loudness of the dialog; and
  - re-encode the asset at a second loudness setting corresponding to the determined loudness, if the first loudness and the second loudness are different by more than a predetermined amount.

36. The system of claim 35, wherein the audio is encoded at a DIALNORM setting and the processor is programmed to:
- determine DIALNORM of the dialog.
37. The system of claim 36, wherein the processor is programmed to:
- determine a DIALNORM of the intervals in the immediate category;
38. The system of claim 35, wherein the processor is programmed to identify the dialog by:
- dividing the audio into time intervals;
  - determining a loudness of each time interval; and
  - identifying time intervals with intermediate loudnesses.
39. The method of claim 38, wherein the processor is programmed to:
- determine the loudness of each time interval based on psycho-acoustic criteria.
40. The system of claim 39, wherein the processor is programmed to:
- determine the loudness based on  $L_{eq}(A)$ .
41. The system of claim 38, wherein the processor is further programmed to:
- discard time intervals with high and low loudnesses.
42. The system of claim 38, wherein the processor is programmed to:
- identify time intervals with intermediate loudnesses by creating a histogram of the loudnesses of the intervals.



43. The system of claim 38, wherein the processor is programmed to:  
determine a loudness of the time intervals in the intermediate category.
44. The system of claim 35, wherein the processor is programmed to:  
correct compression of the audio of the program.
45. The system of claim 35, wherein the processor is further programmed to:  
receive the program from a source;  
store the program in memory for later transmission; and  
retrieve the program from memory.
46. The system of claim 35, wherein the processor is further programmed to:  
demultiplex the audio from the program.
47. The system of claim 35, wherein the processor is further programmed to:  
decompress the audio.
48. The system of claim 47, wherein the processor is further programmed to:  
decompress the audio by converting the audio to a pulse coded modulation  
format.
49. The system of claim 35, wherein the processor is further programmed to:  
perform automatic gain control on the audio prior to identifying the first  
and second loudness levels.
50. The system of claim 35, wherein the processor is further programmed to:  
filter the audio.

51. The system of claim 35, wherein the processor is further programmed to identify the dialog by:

filtering the audio.

52. The system of claim 35, wherein the audio is encoded at a normalized loudness setting and the processor is programmed to:

determine a normalized loudness of the dialog; and

re-encode the asset at a second loudness setting corresponding to the normalized determined loudness, if the first loudness setting and the normalized determined loudness are different by more than a predetermined amount.

53. A method of encoding audio of a program, comprising:

receiving a program, the program having audio encoded at a first loudness setting;

identifying dialog of the program;

determining a loudness of the dialog;

comparing the determined loudness to the first loudness setting; and

encoding the program for storage at the second loudness setting, if the first loudness setting and the second loudness are different by more than a predetermined amount.

54. The method of claim 53, comprising identifying the dialog by:

dividing the audio into time intervals as the audio is received;

determining a loudness of each time interval as the interval is divided; and

identifying time intervals with intermediate loudness after at least a portion of the audio of the entire program is received.

55. The method of claim 53, comprising:  
determining the loudness of each time interval based on psychoacoustic criteria.
56. The method of claim 55, comprising:  
determining the loudness of each time interval based on Leq (A).
57. The method of claim 53, further comprising:  
normalizing the determined loudness of the time intervals having intermediate loudnesses.
58. The method of claim 57, wherein the normalized loudness setting is a DIALNORM setting, the method comprising determining the normalized loudness by:  
determining a DIALNORM of the time intervals having intermediate loudnesses.
59. A system for encoding audio of a program, comprising:  
a receiver to receive a program, the program having audio encoded at a first loudness setting; and  
a processor programmed to:  
identify dialog of the program;  
determine a loudness of the dialog;  
compare the determined loudness to the first loudness setting; and  
encode the program for storage at a second loudness setting  
corresponding to the second loudness, if the first loudness setting and the determined loudness are different by more than a predetermined amount.

60. A method of encoding audio of a program, comprising:  
retrieving a stored program, the program comprising audio;  
identifying dialog of the audio;  
determining a loudness of the dialog; and  
encoding the program at a loudness setting corresponding to the  
determined loudness.
61. The method of claim 60, comprising identifying the dialog by:  
dividing the audio into time intervals;  
determining a loudness of each time interval;  
identifying time intervals with intermediate loudnesses; and  
determining a loudness of the time intervals with intermediate loudnesses.
62. The method of claim 60, further comprising:  
transmitting the program with the encoded loudness setting.
63. The method of claim 60, comprising:  
determining the loudness of each time interval based on psychoacoustic  
criteria.
64. The method of claim 63, comprising:  
determining the loudness of each time interval based on Leq (A).
65. The method of claim 60, further comprising:  
normalizing the determined loudness of the time intervals having  
intermediate loudnesses.

66. The method of claim 65, comprising determining the normalized loudness by:

determining a DIALNORM of the intervals having intermediate loudnesses.

67. The method of claim 60, further comprising:

determining a compression value for the audio

68. A system for encoding audio of a program, comprising:

memory to store the program, the program comprising audio; and

a processor programmed to:

retrieve the stored program;

identify dialog of the audio;

determine a loudness of the dialog; and

encode the program at a loudness setting corresponding to the determined loudness.

69. The system of claim 68, wherein:

the processor is programmed to identify dialog by:

dividing the audio into time intervals;

determining a loudness of each time interval; and

identifying time intervals with intermediate loudnesses; and

the processor is programmed to determine the loudness of the dialog by:

determining a loudness of the time intervals with intermediate loudnesses.

70. The system of claim 68, further comprising:  
a transmitter coupled to the processor, to transmit the program with the  
encoded loudness setting.
71. The system of claim 68, wherein the processor is further programmed to:  
determine a compression value for the audio.